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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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John Robert Owen

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EXAMINER

SINCLAIR, DAVID M

ART UNIT

PAPER NUMBER

2835

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DELIVERY MODE

10/13/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/599,936	<b>Applicant(s)</b> OWEN ET AL.	
	<b>Examiner</b> DAVID M. SINCLAIR	<b>Art Unit</b> 2835	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 August 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :16 March 2007, 13 August 2007, 19 October 2007.

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## **DETAILED ACTION**

### ***Specification***

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The abstract of the disclosure is objected to because insufficient length.

Correction is required. See MPEP § 608.01(b).

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 8-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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5. Claims 8-10 claim a broad range and a narrow range within the same claim. It is unclear to the examiner what range applicant intends to claim, the broad range or the narrow range. For the purpose of examination the examiner is using the broad range.

6. Claims 8-14 recites the limitation "positive and/or negative electrode". There is insufficient antecedent basis for this limitation in the claim.

Firstly there is no mention of a negative electrode in the claim and therefore no mention of a negative electrode having a mesoporous structure. Furthermore the examiner notes a positive electrode is not mention in claim 2. It appears applicant is changing terminology within the claims (anode/cathode/positive electrode/negative electrode). Consistent terminology should be used throughout the claims.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-16 & 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugnaux et al. (2004/0131934) in view of Anderson et al. (5,963,417).

In regards to claim 1,

Sugnaux '934 discloses an electrochemical cell comprising a cathode, an anode and an electrolyte, wherein: the anode comprises titanium dioxide or a lithium titanate (fig. 4; [0039] & [0075]); the electrolyte comprises a solution containing lithium ([0087]). Sugnaux '934 fails to explicitly disclose the electrolyte comprises an aqueous solution containing hydroxide ions.

Anderson '417 discloses an electrochemical cell comprising a cathode, an anode and an electrolyte, wherein: the electrolyte comprises an aqueous solution containing lithium and hydroxide ions (C10:L42-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electrolyte of Anderson '417 as the electrolyte of Sugnaux '934 as such a combination is a mere substitution requiring only routine skill in the art. It has been held to be within the general skill of a worker in the art

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to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

In regards to claim 2,

The references as applied above disclose all the limitations of claim 2 except the titanium dioxide or lithium titanate is mesoporous. However, Sugnaux '934 further discloses the titanium dioxide or lithium titanate is mesoporous ([0075]).

In regards to claim 3,

The references as applied above discloses the claimed invention except for the mesoporous titanium dioxide or lithium titanate has a periodic arrangement of substantially uniformly sized pores of cross-section of the order of  $10^{-8}$  to  $10^{-9}$  m.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the mesoporous titanium dioxide or lithium titanate to have a periodic arrangement of substantially uniformly sized pores of cross-section of the order of  $10^{-8}$  to  $10^{-9}$  m, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In regards to claim 4,

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The references as applied above disclose all the limitations of claim 4 except the positive electrode is formed of a mesoporous material. However, Sugnaux '934 further discloses the positive electrode is formed of a mesoporous material (title & [0075]).

In regards to claim 5,

The references as applied above disclose all the limitations of claim 5 except the mesoporous material is a metal, a metal oxide, a metal hydroxide, a metal oxy-hydroxide or a combination of any two or more of these. However, Sugnaux '934 further discloses the mesoporous material is a metal, a metal oxide, a metal hydroxide, a metal oxy-hydroxide or a combination of any two or more of these ([0049]).

In regards to claim 6,

The references as applied above disclose all the limitations of claim 6 except the mesoporous material comprises a metal selected from: nickel; alloys of nickel, nickel/cobalt alloys and iron/nickel alloys.

Anderson '417 discloses the mesoporous material comprises a metal selected from: nickel; alloys of nickel, nickel/cobalt alloys and iron/nickel alloys (C8:L9-14).



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It would have been obvious to one of ordinary skill in the art at the time the invention was made to add nickel oxide as taught by Anderson '417 in the electrode of Sugnaux '934 to obtain a capacitor with a good specific capacitance and a low leakage current.

In regards to claim 7,

The references as applied above disclose all the limitations of claim 7 except the metal is nickel.

Anderson '417 discloses the metal is nickel (C8:L9-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add nickel oxide as taught by Anderson '417 in the electrode of Sugnaux '934 to obtain a capacitor with a good specific capacitance and a low leakage current.

In regards to claim 8,

The references as applied above discloses the claimed invention except for the mesoporous structure of the positive and/or negative electrode has a pore diameter within the range from 1 to 10 nm, preferably from 2.0 to 8.0 nm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the mesoporous structure of the positive and/or

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negative electrode to have a pore diameter within the range from 1 to 10 nm, preferably from 2.0 to 8.0 nm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In regards to claim 9,

The references as applied above discloses the claimed invention except for t the mesoporous structure of the positive and/or negative electrode has a pore number density of from  $4 \times 10^{11}$  to  $3 \times 10^{13}$  pores per  $\text{cm}^2$ , preferably from  $1 \times 10^{12}$  to  $1 \times 10^{13}$  pores per  $\text{cm}^2$ . It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the mesoporous structure of the positive and/or negative electrode to have a pore number density of from  $4 \times 10^{11}$  to  $3 \times 10^{13}$  pores per  $\text{cm}^2$ , preferably from  $1 \times 10^{12}$  to  $1 \times 10^{13}$  pores per  $\text{cm}^2$ , since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In regards to claim 10,

The references as applied above discloses the claimed invention except for at least 85% of the pores in the mesoporous structure of the positive and/or negative electrode have pore diameters to within 30%, preferably within 10%, more preferably within 5%, of the average pore diameter. It would have been

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obvious to one having ordinary skill in the art at the time the invention was made to have at least 85% of the pores in the mesoporous structure of the positive and/or negative electrode have pore diameters to within 30%, preferably within 10%, more preferably within 5%, of the average pore diameter, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In regards to claim 11,

The references as applied above disclose all the limitations of claim 11 except the mesoporous structure of the positive and/or negative electrode has a hexagonal arrangement of pores that are continuous through the thickness of the electrode. However, Sugnaux '934 further discloses the mesoporous structure of the positive and/or negative electrode has a hexagonal arrangement of pores that are continuous through the thickness of the electrode ([0051]).

In regards to claim 12,

The references as applied above disclose the claimed invention except for the hexagonal arrangement of pores has a pore periodicity of in the range from 5 to 9 nm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the hexagonal arrangement of pores to have a pore periodicity of in the range from 5 to 9 nm, since it has been held that where

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the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In regards to claim 13,

The references as applied above disclose all the limitations of claim 13 except the mesoporous structure of the positive and/or negative electrode is a film having a thickness in the range from 0.5 to 5 micrometers. However, Sugnaux '934 further the mesoporous structure of the positive and/or negative electrode is a film having a thickness in the range from 0.5 to 5 micrometers ([0040]).

In regards to claim 14,

The references as applied above disclose all the limitations of claim 14 except the mesoporous structure of the positive and/or negative electrode has a cubic arrangement of pores that are continuous through the thickness of the electrode. However, Sugnaux '934 further discloses the mesoporous structure of the positive and/or negative electrode has a cubic arrangement of pores that are continuous through the thickness of the electrode ([0051]).

In regards to claim 15,

The references as applied above disclose all the limitations of claim 15 except the titanium dioxide or lithium titanate is nanoparticulate. However, Sugnaux

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'934 further discloses the titanium dioxide or lithium titanate is nanoparticulate ([0051]).

In regards to claim 16,

The references as applied above disclose all the limitations of claim 16 except the anode comprises titanium dioxide. However, Sugnaux '934 further discloses the anode comprises titanium dioxide ([0040]).

In regards to claim 19,

The references as applied above disclose all the limitations of claim 19 except the electrolyte comprises an aqueous solution of lithium hydroxide.

Anderson '417 discloses the electrolyte comprises an aqueous solution of lithium hydroxide (C10:L42-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electrolyte of Anderson '417 as the electrolyte of Sugnaux '934 as such a combination is a mere substitution requiring only routine skill in the art. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

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In regards to claim 20,

The references as applied above disclose all the limitations of claim 20 except is a battery. However, Sugnaux '934 further discloses is a battery ([0060]).

In regards to claim 21,

The references as applied above disclose all the limitations of claim 21 except is a supercapacitor. However, Sugnaux '934 further discloses is a supercapacitor ([0060]).

10. Claims 1 & 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zaghib et al. (2004/0202934) in view of Anderson '417.

In regards to claim 1,

Zaghib '934 discloses an electrochemical cell comprising a cathode, an anode and an electrolyte, wherein: the anode comprises titanium dioxide or a lithium titanate; the electrolyte comprises a solution containing lithium (abstract & [0134]). Zaghib '934 fails to explicitly disclose the electrolyte comprises an aqueous solution containing hydroxide ions.

Anderson '417 discloses an electrochemical cell comprising a cathode, an anode and an electrolyte, wherein: the electrolyte comprises an aqueous solution containing lithium and hydroxide ions (C10:L42-44).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electrolyte of Anderson '417 as the electrolyte of Zaghbi '934 as such a combination is a mere substitution requiring only routine skill in the art. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

In regards to claim 17,

The references as applied above disclose all the limitations of claim 17 except the anode comprises a lithium titanate. However, Zaghbi '934 further discloses the anode comprises a lithium titanate ([0134]).

In regards to claim 18,

The references as applied above disclose all the limitations of claim 18 except the lithium titanate is  $\text{Li}_4\text{Ti}_5\text{O}_{12}$ . However, Zaghbi '934 further discloses the lithium titanate is  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  ([0134]).

In regards to claim 19,

The references as applied above disclose all the limitations of claim 19 except the electrolyte comprises an aqueous solution of lithium hydroxide.

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Anderson '417 discloses the electrolyte comprises an aqueous solution of lithium hydroxide (C10:L42-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electrolyte of Anderson '417 as the electrolyte of Zaghib '934 as such a combination is a mere substitution requiring only routine skill in the art. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

In regards to claim 20,

The references as applied above disclose all the limitations of claim 20 except is a battery. However, Zaghib '934 further discloses is a battery ([0015]).

In regards to claim 21,

The references as applied above disclose all the limitations of claim 21 except is a supercapacitor. However, Zaghib '934 further discloses is a supercapacitor ([0015]).

11. Claims 1, 4-10, 13, 19, & 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson '417 in view of RU2170467C1 hereafter referred to as Bekesh.



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In regards to claim 1,

Anderson '417 disclose an electrochemical cell comprising a cathode, an anode and an electrolyte, wherein: and the electrolyte comprises an aqueous solution containing lithium and hydroxide ions (claim 21 & C10:L42-44). Anderson '417 fails to disclose the anode comprises titanium dioxide or a lithium titanate.

Bekesh discloses adding titanium dioxide to the electrodes of a double layer capacitor (abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add titanium dioxide as taught by Bekesh to the electrodes of Anderson '417 to obtain electrodes with improved moisture absorption and enhanced specific power.

In regards to claim 4,

The references as applied above disclose all the limitations of claim 4 except the positive electrode is formed of a mesoporous material. However, Anderson '417 further discloses the positive electrode is formed of a mesoporous material (C4:L2-10).

In regards to claim 5,

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The references as applied above disclose all the limitations of claim 5 except the mesoporous material is a metal, a metal oxide, a metal hydroxide, a metal oxy-hydroxide or a combination of any two or more of these. However, Anderson '417 further discloses the mesoporous material is a metal, a metal oxide, a metal hydroxide, a metal oxy-hydroxide or a combination of any two or more of these (C4:L2-10).

In regards to claim 6,

The references as applied above disclose all the limitations of claim 6 except the mesoporous material comprises a metal selected from: nickel; alloys of nickel, nickel/cobalt alloys and iron/nickel alloys. However, Anderson '417 further discloses the mesoporous material comprises a metal selected from: nickel; alloys of nickel, nickel/cobalt alloys and iron/nickel alloys (C8:L9-14).

In regards to claim 7,

The references as applied above disclose all the limitations of claim 7 except the metal is nickel. However, Anderson '417 further discloses the metal is nickel (C8:L9-14).

In regards to claim 8,

The references as applied above disclose all the limitations of claim 8 except the mesoporous structure of the positive and/or negative electrode has a pore

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diameter within the range from 1 to 10 nm, preferably from 2.0 to 8.0 nm.

However, Anderson '417 further discloses the mesoporous structure of the positive and/or negative electrode has a pore diameter within the range from 1 to 10 nm, preferably from 2.0 to 8.0 nm (C10:L59-60).

In regards to claim 9,

The references as applied above discloses the claimed invention except for t the mesoporous structure of the positive and/or negative electrode has a pore number density of from  $4 \times 10^{11}$  to  $3 \times 10^{13}$  pores per  $\text{cm}^2$ , preferably from  $1 \times 10^{12}$  to  $1 \times 10^{13}$  pores per  $\text{cm}^2$ . It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the mesoporous structure of the positive and/or negative electrode to have a pore number density of from  $4 \times 10^{11}$  to  $3 \times 10^{13}$  pores per  $\text{cm}^2$ , preferably from  $1 \times 10^{12}$  to  $1 \times 10^{13}$  pores per  $\text{cm}^2$ , since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In regards to claim 10,

The references as applied above discloses the claimed invention except for at least 85% of the pores in the mesoporous structure of the positive and/or negative electrode have pore diameters to within 30%, preferably within 10%, more preferably within 5%, of the average pore diameter. It would have been

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obvious to one having ordinary skill in the art at the time the invention was made to have at least 85% of the pores in the mesoporous structure of the positive and/or negative electrode have pore diameters to within 30%, preferably within 10%, more preferably within 5%, of the average pore diameter, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In regards to claim 13,

The references as applied above disclose all the limitations of claim 13 except the mesoporous structure of the positive and/or negative electrode is a film having a thickness in the range from 0.5 to 5 micrometers. However, Anderson '417 further discloses the mesoporous structure of the positive and/or negative electrode is a film having a thickness in the range from 0.5 to 5 micrometers (C9:L24-26).

In regards to claim 19,

The references as applied above disclose all the limitations of claim 19 except the electrolyte comprises an aqueous solution of lithium hydroxide. However, Anderson '417 further discloses the electrolyte comprises an aqueous solution of lithium hydroxide (C10:L42-44).

In regards to claim 21,

The references as applied above disclose all the limitations of claim 21 except is a supercapacitor. However, Anderson '417 further discloses is a supercapacitor (title).

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPAT 4,422,917

USPAT 6,379,843

USPAT 6,500,575

USPAT 7,368,202

USPGPUB 2005/0058907

USPGPUB 2004/0016646

### ***Communication***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID M. SINCLAIR whose telephone number is (571)270-5068. The examiner can normally be reached on Mon - Thurs. 8-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JAYPRAKASH N. GANDHI can be reached on (571) 272-3740. The fax

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phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. M. S./  
Examiner, Art Unit 2835  
/Eric Thomas/  
Primary Examiner, Art Unit 2835